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ANALYSIS OF THE PERCEIVED REWARD
TO THE RECEIVER AND ITS IMPACT ON THE
PREDICTIVE MODEL OF TECHNOLOGY TRANSFER

James Hill Welborn

NAVAL POSTGRADUATE SCHOOL

Monterey, California



THESIS

ANALYSIS OF THE PERCEIVED REWARD
TO THE RECEIVER AND ITS IMPACT ON THE
PREDICTIVE MODEL OF TECHNOLOGY TRANSFER

by

Keith Eugene Nyenhuis

James Hill Welborn

June 1976

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20. (continued)

interviewing instrument are presented and conclusions support the hypothesis that perceived reward is a vital factor in predicting idea flow.

Analysis of the Perceived Reward to the Receiver
and its Impact on the Predictive Model of Technology Transfer

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I. INTRODUCTION

In this dynamic world of people and organizations, no theory, process, or methodology is significantly sound and without variation for any sustained period of time. The inventions and innovations which contribute to this phenomenon in such fields as electronic communications, transportation, and computer technology, have increased in number in recent decades. In view of this, one of the greatest shortcomings of mankind today is his lack of ability to make the best usage of the vast amount of technology that is available to him. Immense quantities of information have been researched, completely developed, or are in partial states of development but have gone unused and maybe even unknown to possible users. Why, in view of the modern means of transfer available, does this large amount of information not come into use sooner? The lag in adoption is perhaps a normality and as such, could be caused by several factors. Among these causal factors could be the reward system in an organization or lack of it. Also, it is conceivable that the lag could be lessened by several factors, among which could again be the reward system in an organization.

A. OBJECTIVE

The objective of this study is first to examine rewards as perceived by an individual in an organization and the impact of these

rewards as a motivating factor in enhancing the flow of information between the researcher and the user. The hypothesis, which will be shown to be true using empirical data, is that rewards, as perceived by an individual in an organization, are important in the rate of movement of technology within that organization.

Technology transfer is basically the movement of information from the point of discovery to new users. A Theoretical Predictive Model proposed by Creighton, Jolly, and Denning [1972] contains nine factors believed to be important in the transfer process. Perceived reward is included as one of the theoretical factors within that predictive model.

Secondly, this thesis will attempt to evaluate the effect of perceived rewards on the technology transfer process. Further, to show that perceived reward to the receiver does, in fact, belong as a factor of the Theoretical Predictive Model of technology transfer. The method utilized for the collection of data was a situational interview. This method was chosen as it was felt to be the best and most accurate means of obtaining adequate data. It was administered by the authors who were thoroughly familiar with the concepts which assured accurate interpretations. Twenty Federal Government Civil Service Employees, GS 13 through GS 15 were given the situational interview. The data obtained were used to evaluate the stated hypothesis.

Thirdly, this study will evaluate the relationship of other environmental factors which exert pressure on reward structures. Among

these will be the formal organization where the individual finds himself who perceives a reward and transmits the idea. Also, the relationship of informal linkers in the organization as discussed by Creighton, Jolly and Denning [1972] will be investigated.

B. BACKGROUND

In order to more effectively bridge or reduce the time gap between the research and the use, an understanding of technology transfer is important. Further, the importance of the utilization of applicable knowledge by more than one organization is now being more frequently recognized as an economic factor in our society. The ever increasing cost of fundamental research makes it advantageous to make efficient use of information being developed. As expenditures for research and development have continued to increase, the existence of what Havelock terms "the knowledge gap" has become readily apparent to both the suppliers or sources of technological information and the potential users of the knowledge [Havelock, 1971].

It has been common practice for Federal Agencies to interpret and effect technology transfer in terms of documenting the findings and disseminating the information to all possible users [Doctors, 1969]. This interpretation and course of action was embarked upon in that it was formerly thought that the dissemination of technical literature was an efficient mechanism for accomplishing the task of technology transfer. Not until recent years has the orientation of technology

transfer shifted to the realization that the transfer of technologies is one aspect in the larger process of technological innovation. Technological innovation is broadly defined to include an idea which is perceived by the individual to be a new method, means, or capacity to perform a particular activity. The result of technology transfer may thus be the acceptance by a user of a practice common elsewhere, obtained or learned from colleagues in other organizations or from conferences attended, or it may be a different or exact application of a given technique designed for another use in another organization [Gruber and Marquis, 1969].

Innovation refers to the series of activities which in effect delivers an invention or idea to its first acceptance and use. It should be noted that innovation is initiated not just through the generation of an idea or invention, but can be stimulated from recognition of a need or technical opportunity. In fact, recent results from different researchers indicate that most successful innovations arise from need recognition rather than idea generation or inventions [Evry and France, 1973] [Baker, 1967]. That is, demand-pull rather than technology-push was found to be the stimulus in most cases of successful innovations [Gee, 1974].

Technology transfer can formally be defined as "a purposeful, conscious effort to move technical devices, materials, methods, and information from the point of discovery or development to new users,"

[Gilmore, 1969]. Technology transfer can be considered to be the application of technology to a new use or users. It may be a direct application or may include the need for adapting or tailoring the technology to its new use or user [Gee, 1974]. Technology transfer should also be distinguished from research utilization or technology utilization, which refers to the translation of research results or knowledge into goods or services to satisfy some requirement or need of the user [Anuskiewicz, 1973]. It may be viewed as the process by which research utilization is directed to a new use or user or regarded to be the secondary utilization of existing technology [Gee, 1974].

A study by Creighton, Jolly and Denning [June, 1972] isolated and identified the theoretical factors that may enhance the rate of adoption of technology innovation. The factors of this model are consistent with those of the authors cited herein and provide a framework for empirical studies in order to develop in depth knowledge about the technology transfer process. It is believed that much of the answer to bridging the gap between the idea or research and its utilization process depends upon a better understanding of the nine factors of the theoretical model.

The transfer mechanism is not merely a series of communications channels through which information flows, but it is a complex mechanism involving personal interactions. A program of technology transfer must include a mechanism which effectively links or couples

the source of knowledge with the eventual utilization of that knowledge [Jolly, 1974] (See Figure 1). It is a human resource mechanism which can be incorporated into either the supplier or the user environment even though the consensus is "that action for really effective technology transfer should start with potential users rather than sources," [Gilmore, 1969].

The concept of the transfer mechanism is delineated in the conceptualization of the process of technology transfer as it applies to the nine factors within the Theoretical Predictive Model of technology transfer (See Figure 2). Each factor in the model is discussed briefly below:

DOCUMENTATION (DOCU):

This is the format, organization, or presentation of the technology being transferred. Format and language relate directly to the understanding of the material by the receiver. One cannot utilize information that one cannot interpret.

DISTRIBUTION (DIST):

This is the physical channel through which technology flows and involves both the number of entries and ease of access into the channel as well as the formal distribution plan.

ORGANIZATION (ORGA):

This is the receiver's perception of the formal organization.

Schon [1967] describes the attitude of many formal organizations

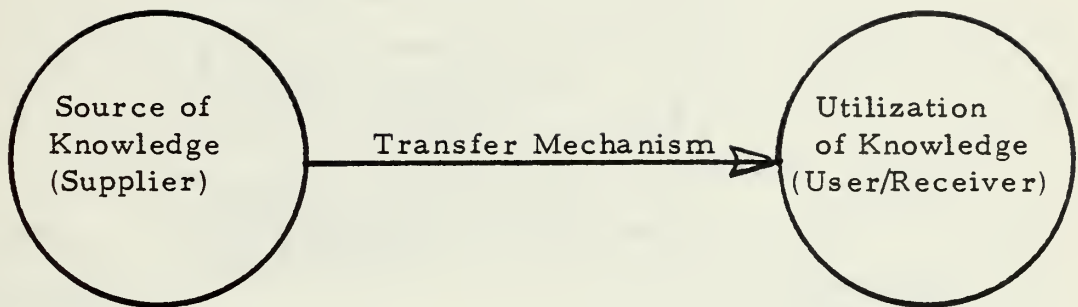


Figure 1 A Simplified View of the Transfer Mechanism

The transfer mechanism represents the interaction of people and need not be independent, but may be incorporated in either the supplier or user environment (After Jolly, 1974).

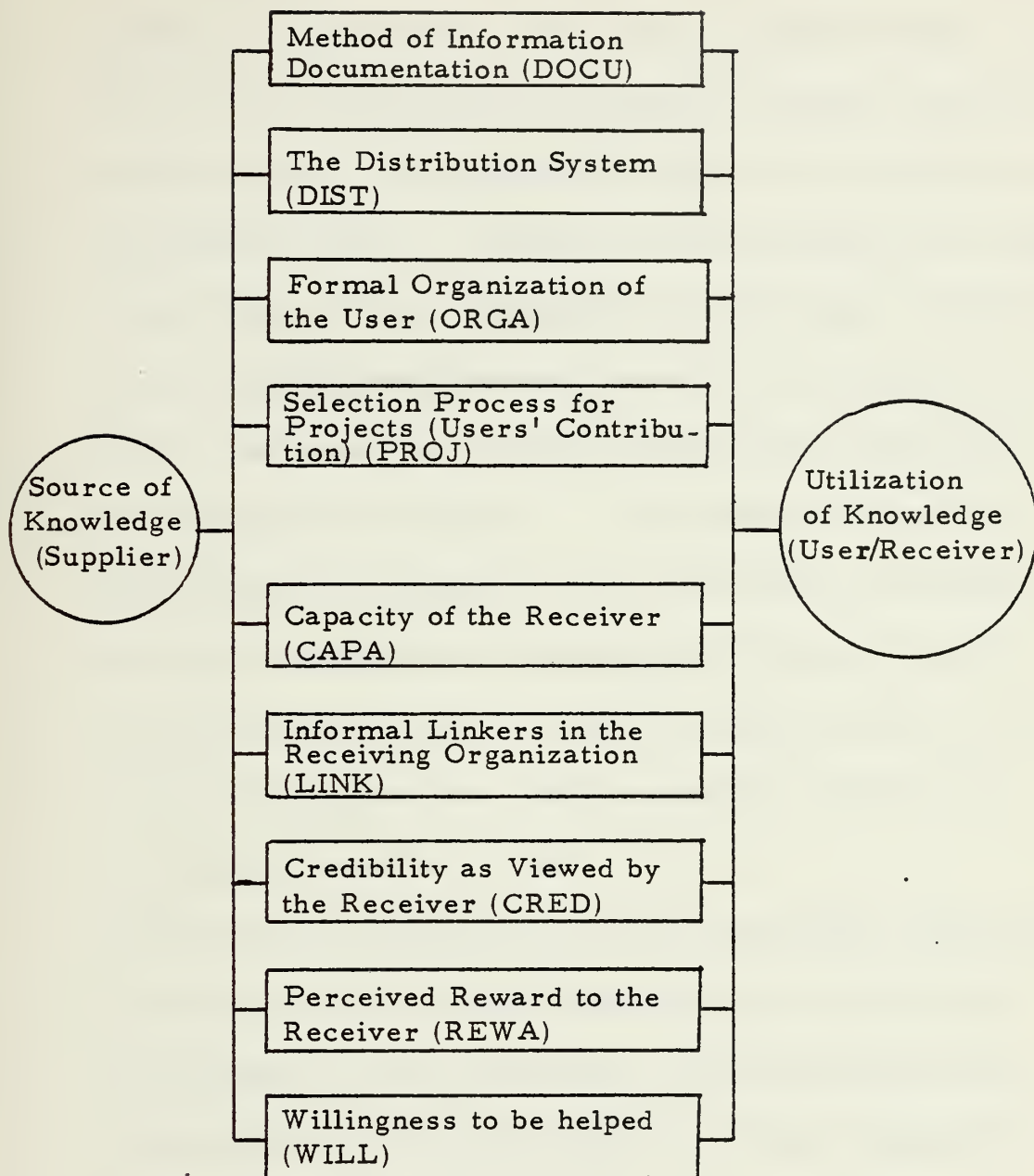


Figure 2 Predictive Model of Technology Transfer

The linking mechanism necessary to achieve effective technology transfer is described by identifying the factors that contribute to movement of technology from the source of knowledge (supplier) to the utilization of knowledge (user/receiver) (After Jolly, 1974).

to technology change as, "the theory of the stable state, as applied to organizations, is the enemy of adoptive change. In fact, in most organizations the structure of power, the nature of the business, the organization of work, are all in the process of continual change ... but there is a taboo against the acceptance of this change. The representative of a new order, in the organization, feels obligated to present himself as, for all practical purposes, permanent, and to behave as though the changes he is introducing will be the last ... " Furthermore, Schon [1967] characterized an organization that is favorable to technology transfer and utilization of knowledge as living in a state of pressure to perform where conflict is resolved by fiat, where resources are committed without hesitation, and where uncertainty is converted to risk.

Thus a formal organization may have bureaucratic tendencies that tend to obstruct change simply because a comfortable environment is one of equilibrium. The determination of an attitude to accept or reject change by a formal organization can produce an insight into that organization's expected utilization of new and innovative ideas.

PROJECT (PROJ):

This factor refers to the selection process for research and development projects undertaken by the source, and the

receiver's contribution to that process. Two authors have shown that "a basic reason for the lack of research utilization is that the process is often begun with the research process, rather than the client's needs," [Rogers and Jain, 1969].

CAPACITY (CAPA):

The capacity of the user to utilize new and innovative ideas covers a wide spectrum of traits including venturesomeness, wealth, power, education, experience, age, selfconfidence, cosmopolitaness, professional status, imagination, and sociability.

The attributes that did not appear to be important were perseverance, peer status, intelligence, occupational status, social status, shrewdness, experimentiveness, and sensitivity.

LINKER (LINK):

This refers to the process of and effects of informal linkers in the receiving organization. This concept assumes that the linker operates within the organization which receives the knowledge. This restriction on the role of the linker decreases the usual typology of linking roles to that of the leader (gate keeper and opinion leader), early adopter of an innovation (innovator), and early knower of an innovation. Therefore, the user's linking role is defined as: "to link by taking initiative on one's own behalf to seek out scientific knowledge and derive useful learning therefrom," [Havelock, 1971].

The linker concept as applied here is that a linker functioning within the user's organization would exhibit identifying traits and characteristics similar to the gate keeper, opinion leader, innovator, and early knower of an innovation.

CREDIBILITY (CRED):

Credibility is an assessment of the reliability of the information as perceived by the receiver. It is evaluated by analyzing both the source and channel of the message because it is often difficult for the individual to distinguish between the source of the message and the channel which carries that message. Thus the individual attaches a composite credibility to the message derived from both perceived source and perceived channel.

REWARD (REWA):

Reward is the perceived and actual recognition of innovative behavior in the social system of which the individual is a member. "Reward achievement falls into two broad categories: Rewards intrinsic to the work itself and those extrinsic to the technical content. The implication is that the research director (or manager) must give close attention to the whole system of rewards, both intrinsic and extrinsic. He must live with the paradox that extrinsic rewards cannot be relied on to motivate achievement, but that when achievement occurs, the extrinsic rewards should be consistent," [Pelz and Andrews, 1966].

WILLINGNESS (WILL):

Willingness relates to the individual's ability and desire to accept change in the organization of which one is a member.

The adoption rate of ideas was studied by Gallup. Some of his findings are quite appropriate to the problem of technology transfer. For example, Gallup [1955] pointed out that although an idea has been accepted intellectually, normally a long period of time passes before it is incorporated into the thinking of the person who has accepted it.

The concept that you can lead a horse to water, but that you cannot make him drink certainly applies to the case of new and innovative ideas. Awareness, even first hand knowledge of a new and innovative idea is not sufficient to assure its use.

There must be a willingness and interest or perhaps even more significantly an internal motivation to utilize a better method, process or concept [Jolly, 1974].

The transfer mechanism is believed to be a function of the nine factors of the technology transfer predictive model which may be equatable to the total communications process. Documentation, search facilities, and distribution channels are significant elements in the methodology model that considers and describes the process of the flow of technical information from the source to the user. Formal communications may be identified as separate factors from the informal

factors. The informal factors are behavioral and sociological in nature and tend to contribute heavily to the success of the utilization of knowledge by an organization. Figure 3 conceptualizes the fact that the knowledge flow enhancement factors may be logically divided into two categories. It further defines each of the categories and clarifies the definition of formal versus informal.

Using this as a basis for grouping the factors, the original model of technology transfer as shown in Figure 2 may be divided to reflect the importance of the formal versus the informal communications components of the transfer mechanism (See Figure 4) [Jolly, 1974].

The informal factors are less subject to improvement through structural change. However, concentrated interests and efforts should cause significant change in the informal factors area. Education and training can be effective in changing a person's attitude and feelings about the relative importance and usefulness of the technology transfer process [Jolly, 1974].

To date, only the linker concept has been empirically analyzed as a factor in support of the Theoretical Predictive Model of technology transfer [Jolly, Creighton, and Denning, 1972] and [Jolly and Creighton, 1974]. The linker factor has been categorized as an informal factor along with capacity, credibility, rewards, and willingness [Jolly, 1974]. Of these informal factors, the perceived reward on the part of the receiver is deemed to be one of the most

Knowledge flow enhancement factors

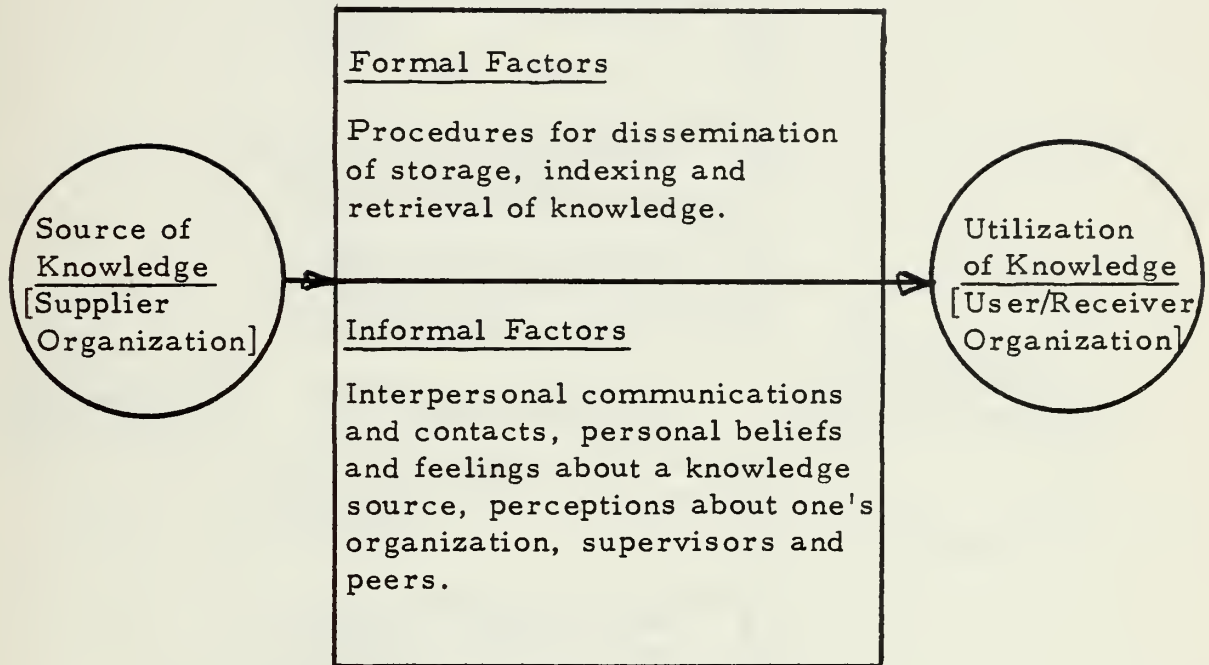


Figure 3 A Simplified Model of Technology Transfer

- a. The movement of knowledge from the source to the user/receiver may be classified according to formal factors and informal factors.
- b. The formal and informal factors are defined. The formal factors are procedural in nature, and the informal factors are behavioral (After Jolly, 1974).

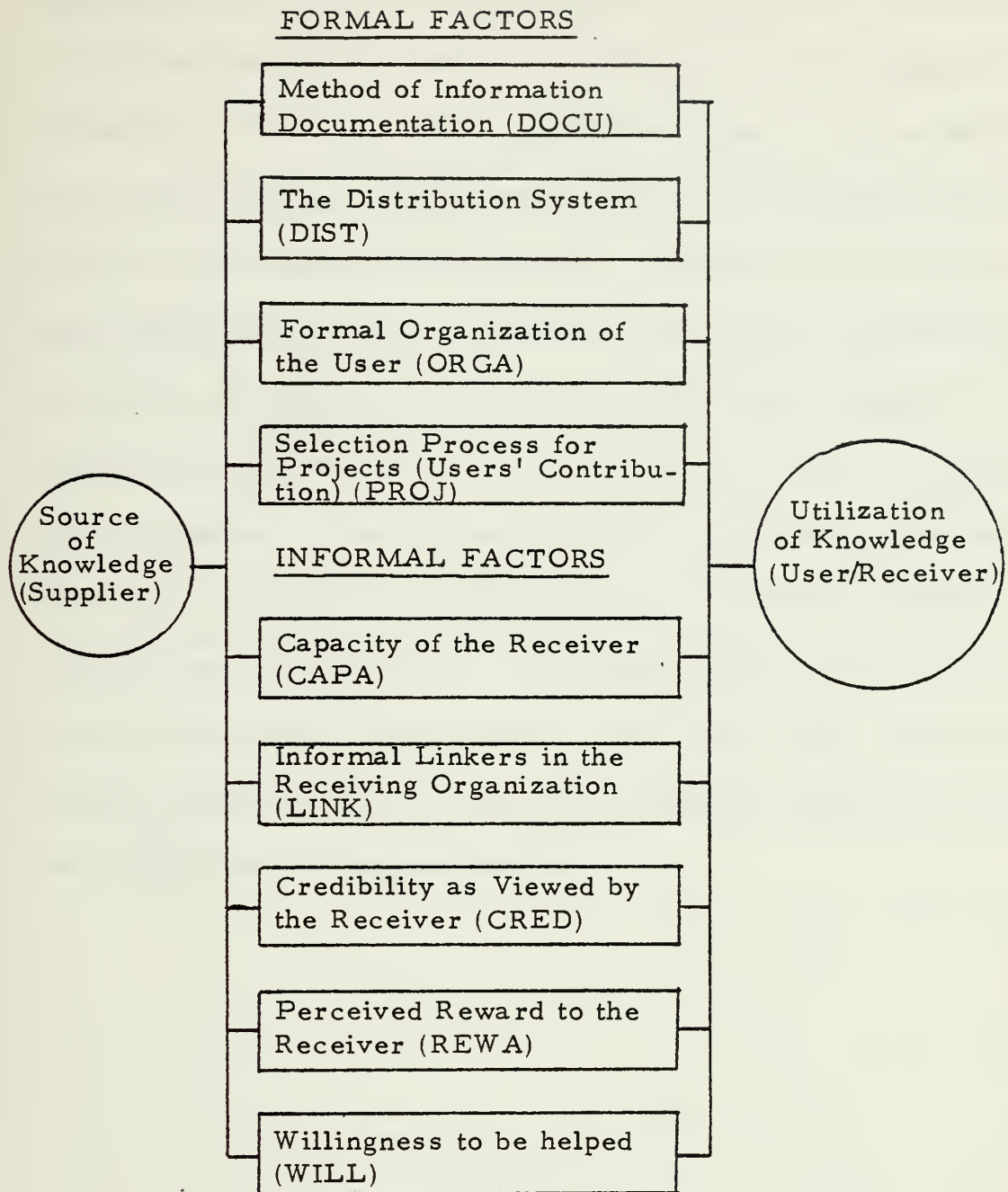


Figure 4 An Expansion of the Predictive Model of Technology Transfer

The factors in the predictive model have been grouped according to the classifications formal factors and informal factors. The factors classified formal are procedural in nature and the factors classified informal are interpersonal and/or behavioral (After Jolly, 1974).

influential factors which directly affects the individual and his behavior in an organization. It is believed, however, that the organization and its policies will have an effect, positive or negative, on the individual's perceived rewards, thus moving this factor to a position more closely related to the formal group of factors. In the process of bridging the gap between the idea and its utilization in the transfer mechanism, the perception of rewards on the part of the individual is believed to be a motivating factor in whether or not he offers his ideas or solutions to his organization. It is believed possible to empirically show that perceived reward is an integral part of the Theoretical Predictive Model of technology transfer. It is further believed that it is possible to empirically show that perceived reward, as a factor, relates heavily to other factors within the Theoretical Predictive Model and to other personnel behavior characteristics.

II. CONCEPTUAL FRAMEWORK FOR VIEWING REWARDS

The Theoretical Predictive Model of technology transfer represents the transfer mechanism allowing technology to transfer from source of knowledge to the utilization of knowledge. As one analyzes the Theoretical Predictive Model, many elements refer to an individual's personal belief, feelings and perceptions about one's organization, supervisors and peers. These behavioral elements which represent informal factors in the transfer mechanism are important in determining whether technology transfer will take place into the user or receiver organization. Interest is normally attracted to these behavioral elements because people generally feel they know a great deal about behavior and with good reason. From infancy, one learns about behavior through personal experiences, by observing people and from the communicated knowledge of others. However, one discovers many gaps in this knowledge and often many uncertainties. Unique problems are faced in getting along with others [Atkinson, 1964]. There must be interaction with people even though they are difficult to understand. Often understanding ourselves is sufficiently complicated.

It is recognized therefore that human behavior is a vitally important issue when one is concerned with the flow of technology to its

useful application. Yet the extent of the impact of these behavioral elements on technology transfer is not fully known. With this as a background, it is the intent of this study to examine the impact of the behavioral element, perceived reward to the receiver, and technology transfer or the transfer mechanism. This particular element was chosen by the authors because of its immediate impact on the kinds of reward systems which should exist in an organization to allow unhampered flow of ideas for organizational improvement. The remainder of this chapter will discuss the behavioral influences on the perceived reward to that individual called the receiver who initiates or conceives an idea in an organization and the factors which impact on this receiver to ultimately determine whether technology will be transferred.

Immediately, when one broaches the subject of individual behavior and what motivates the individual to act, one must contend with the influences of individual needs and drives inherent within persons. Much research has been accomplished in the area of needs and drives and impact on subsequent behavior. Woodworth [1958] states that a need may remain at the physiological level and not force its way into the realm of behavior. Frequently, however, needs play a vital function in the motivation process. A drive is conceived as belonging in the behavior realm and as directly motivating instrumental activity [Woodworth, 1958].

Realizing that individual needs do represent a vital part of the motivation process, Maslow's [1965] Need theory perhaps best represents the need hierarchy which motivates one to action. Maslow's Need theory states that human beings, as part of their intrinsic constitution, have psychological as well as physiological needs. Thus, all of us have needs or goals which are physiological, safety, social, ego, and self fulfillment. These needs are related to one another in a developmental way and a definitely ascending hierarchy. This hierarchy is based upon the order of priority of the need, and its strength. All the basic needs may be considered as simply steps along a time path leading to self actualization, which includes all the other basic needs [Megginson, 1967]. There is a basic motivation within the individual to achieve each need with its associated satisfaction and press on toward the next need which is unfulfilled.

Differing from a need, yet operating in the same environment, a drive has two distinguishable characteristics, intensity and direction. Like a force or vector, it can be represented by an arrow, the intensity being shown by the length of the shaft and the direction by the arrowhead. The direction is toward an attractive incentive or away from a repellent one. A drive has the additional characteristic of persistence [Woodworth, 1958]. Individuals are composed of both needs and drives. Individuals have different needs with varying degrees of intensity of the drives to satisfy their needs, therefore, they are motivated by varying reward forms.

Organizations are so structured as to provide incentives in multiplicity of reward forms to appeal to individuals. There are two kinds of incentives that act as stimulants, namely, material and nonmaterial. Material incentives, which consist of money, goods, or services tend to be in such forms that they can be used to acquire other satisfactions. Nonmaterial incentives are intangible appeals which tend to be satisfaction yielding within themselves [Megginson, 1967].

The material incentives or extrinsic rewards take the form of wage plans, profit sharing, bonuses, and other tangible rewards. The nonmaterial intrinsic rewards include such things as personal development, self satisfaction, pride, prestige, establishing a favorable peer relationship, power, and negatively viewed, certain types of coercion. These then represent the reward structure which exists within the organization offering incentives for performance.

The intrinsic needs of the individual which exist in an unsatisfied form and their associated drives determine the motivating force provided by either the material or nonmaterial incentives offered by the reward structure of the organization. Further, the motivating force which encourages an individual to develop an idea or alter existing technology for application within his organization is often dependent on his needs and benefits perceived from the reward structure. His perception of the organization's ability to satisfy these needs is often related to his willingness to transmit his ideas, or application of ideas

of others, for useful purposes within the organization. Therefore, the perceived reward for the receiver or initiator of an idea within the organization is a strong motivating force which incites him to action or stagnation depending on his perceptions.

A theoretical Rewards Model (See Figure 5) has been developed to provide a method of thinking about the relationships among the variables that effect the willingness of the receiver to utilize and transmit an idea for application in his organization. The Rewards Model is presented as a mechanism to integrate the findings of this study as discussed in subsequent chapters.

VARIABLES CONTAINED IN THE REWARDS MODEL

IDEA

This variable represents a thought or concept which spawns in the mind of a person either as an original thought or develops through attendance of a conference, reading a trade journal or through any other mode of communication.

ACTUAL REWARD

This term refers to outcomes or returns to a person that are provided by himself or by others. If the individual receives something he does not want, this would not be considered a reward. Further, these outcomes can be either intrinsic to the person's own behavior, such as a feeling of accomplishment, or extrinsic in the sense that other people provide them, as when the company

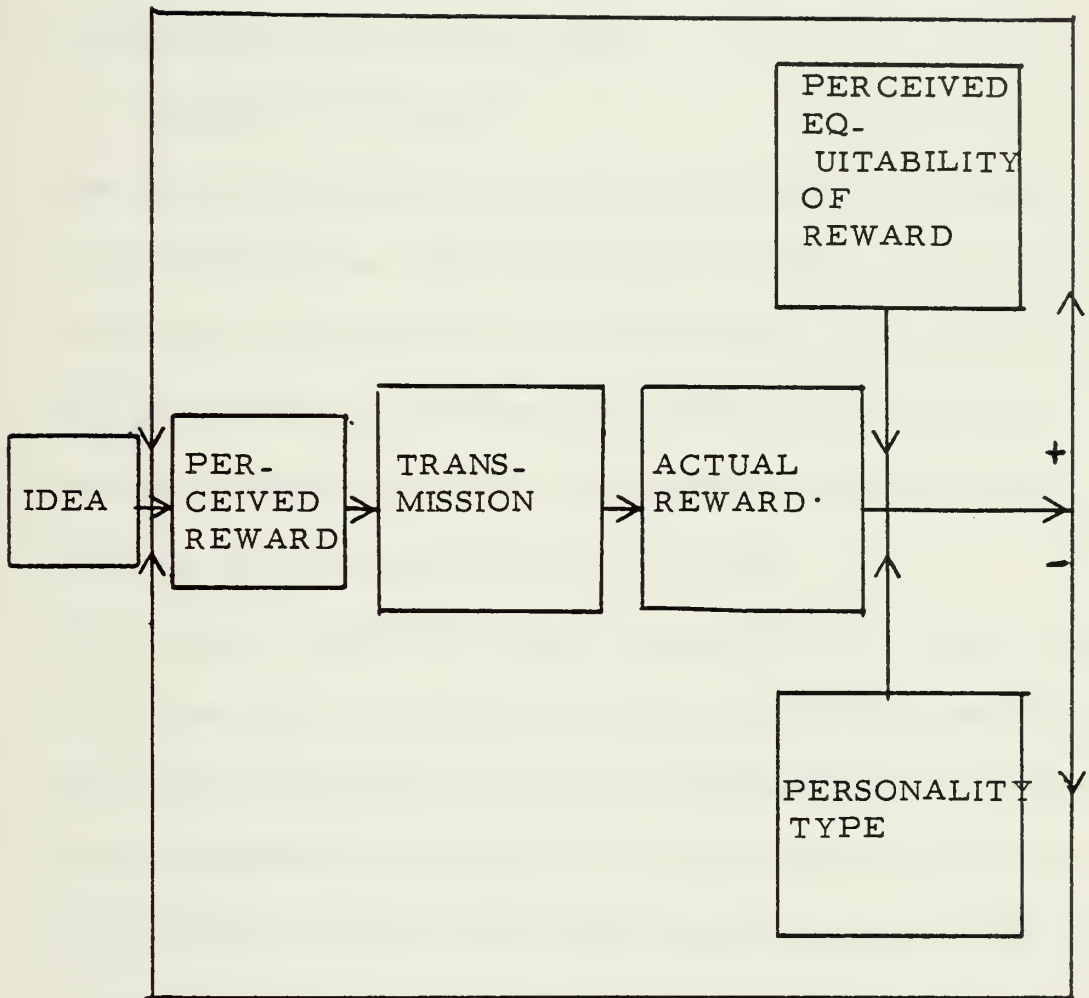


Figure 5 The Theoretical Rewards Model

A Theoretical Rewards Model has been developed to provide a method of thinking about the relationships among the variables that effect the willingness of the receiver to utilize and transmit an idea for application in his organization.

increases a manager's pay on the basis of the recommendation of a superior. The only way to measure intrinsic rewards is to ask the person concerning his feelings. By definition, only he knows whether he has rewarded himself intrinsically. For extrinsic rewards, one has to look at objective organization actions [Porter and Lawler, 1968].

PERCEIVED REWARD

The aspect of the perceiving process that we are emphasizing is the personal one. The same objective world, the same objective situation, can be structured very differently by two receivers with different histories and different life styles, or by the same receiver at different periods under different patterns of need, tensions, psychosomatic states [Cole, 1953].

This variable is of prime importance and refers to those outcomes or returns that are perceived by a person out of the reward structure of the organization. Perceived rewards will be a subset of the reward structure. Therefore, a person will not perceive a reward that is not part of the actual reward structure. The perceived reward can be either of a positive or negative nature. A positive perceived reward is that anticipated reward which when received would bring satisfaction to the individual's needs. If the perceived reward is negative in nature, the person will hold the idea within himself and it may spawn later in a different form,

an associated idea or through another media or organization. If, however, the rewards perceived are positive in nature, transmission of that idea will occur into the organization for its utilization.

TRANSMISSION

This variable represents the transfer of ideas from the point of inception in the receiver through original thought or outside impetus to application and utilization within the organization.

PERCEIVED EQUITABILITY OF REWARD

In any job, most individuals have an implicit notion (which they frequently are willing to state explicitly) concerning the amount of rewards that ought to be available for a person performing the type of work required in that job [Porter and Lawler, 1968]. Such notions would be based on the individual's perceptions of the value of the job or his idea. Frequently, the individual will take into account factors that the organization might not consider at all in deciding the equitable or fair amount of rewards that the organization should provide. Therefore, this variable refers to the level or amount of rewards that an individual feels he should receive as the result of transmission of an idea.

PERSONALITY TYPE

This variable refers to the different types of individuals which exist from the self-motivated to the person who is motivated by

external factors. It is recognized that there are personality types which have a strong internal drive mechanism who are not deterred by negative rewards. This is characteristic of the self-motivated person who after experiencing rejection is willing to transmit ideas again as they occur. There are others as characterized by the externally motivated person who may be deterred by the negative response and suffer defeat and paralysis of further idea generation and subsequent transmission. The personality type has a direct influence on the negative or positive feedback loop for subsequent transmission of ideas.

The above variables are the key factors that pertain directly to the operation of the Rewards Model itself. It must be realized that this model is not meant to operate in a vacuum but to interface with the organization in which the receiver finds himself. The impact of the type of organization has an effect whether it be an expanding, contracting or merely a status quo situation. The innovativeness of the varying organizations have an impact on the willingness of the receiver and organization to deal with new ideas and applications. Therefore, the Rewards Model must be conceptualized as existing in an organization which in turn is affecting the variables of the model.

Further, a feedback loop was felt necessary because of the need to consider the impact of past learning on future actions of the receiver. This loop in the Rewards Model implies that the way in which an

organization rewards a receiver following his transmission of the idea for utilization, will affect (for a given time) his perceptions of the connection of rewards to his willingness to transmit thoughts. This will, in turn, affect his expectancy concerning whether transmission leads to rewards. To this extent, then, the model utilizes past learning experiences as a factor in determining expectancies about the future.

III. METHODOLOGY

In order to gather the necessary data to support the study, it was necessary to determine which survey technique was to be employed. Among the techniques considered were the oral interview, telephone survey or interview, and a mail survey.

The oral interview method was chosen as the best available means of obtaining the information needed for the study. In the area of rewards, especially intrinsic ones, an effective way to measure the amount of rewards that individuals receive from their jobs is to establish a rapport with a person and then determine his feelings. Responses concerning other variables also depend upon obtaining an expression from the individual involved as to what he considers a fair or appropriate level of reward. Such judgment could be made for the person by other individuals, but the inference that these necessarily would be accurate representations of the feelings of the person in question usually would not be justified [Porter and Lawler, 1968].

The population chosen for the interview was a group of students in a program sponsored by the Naval Aviation Executive Institute. This program is in conjunction with the Naval Postgraduate School's Continuing Education program and is a graduate management education curriculum being conducted at Pt. Mugu, California. Of the

twenty-seven students available within this program, twenty students were interviewed. The remaining seven were either out of the local area or unavailable during the interviewing period. The population was composed of Federal Government Civil Service Employees in the higher grade levels. The primary reasons for selecting this population for the study was to capture the great variations of duty assignments, the wide geographical areas represented, experience level, and educational level within the population. General characteristics of the population surveyed are as follows:

(1) Engineers by profession

(2) Grade level GS 13, 14, and 15

(3) All possess undergraduate degrees. 30% hold prior graduate degrees

(4) 45% were 40 years of age or under while 55% were over 40.

The authors traveled to the Naval Aviation Executive Institute facilities in Pt. Mugu, California to conduct all personal interviews.

The general purpose in conducting the interview was to obtain results which would substantiate or disprove the hypothesis that rewards, as perceived by individuals in an organization, is a contributing factor to the Theoretical Predictive Model of technology transfer. As stated by Kahn and Cannell [1958], "We use the interview to refer to a specialized pattern of verbal interaction, initiated for a specific purpose, and focused on some specific content area, with consequent elimination of

extraneous material." It is a pattern of personal interaction in which the role relationship of interviewer and respondent is highly specialized.

IV. DATA COLLECTION

The situational interview method was chosen as the best and most accurate means of obtaining the necessary data. It was administered by an interviewer who was thoroughly familiar with the concepts and who was able to assure that the interpretation of each question was appreciated on an equal basis by respondents. Each question utilized in the interview was designed to specifically capture certain responses and behavior patterns which would result in a level of importance of rewards to each individual. Although the questions were specifically designed and structured to sequentially flow within a logical thought process framework, sufficient latitude was also recognized and deemed necessary to achieve the desired response. The questionnaire is shown in Appendix A.

The first question was: "Please relate to me an idea that you have had in recent years in an organization which was utilized/not utilized be it either management or technically oriented." This question was presented to the respondent after a brief explanation as to the purpose of the interview. The background explanation included general information so that the research objective could be easily understood. The purpose of the question was to identify an idea that had been introduced into an organization and further, to determine

if that idea had been utilized. If the interviewee first related a particular situation in which the idea offered was utilized, technology transfer was assumed to have occurred [Jolly, 1974]. Instances where the first idea was utilized, the interviewee was then asked to relate an idea that was not utilized. The latter case is considered to be a situation in which technology transfer did not occur.

In both the utilized and non-utilized responses, questions two through eight were repeated. Thus, the oral interview procedure was cycled twice with each interviewee; once for the utilized response and once for the non-utilized response. The only exception to this procedure was that question three was not repeated during the second cycle in that the response would be duplicative. Question three asked for a self-determination as to whether a person was a self or externally motivated individual and will be discussed in more detail below.

The second question was: "Could you relate how you generated the idea? Was it from something you read or maybe a conference attended?" This question was intended to determine if the idea generated was original or otherwise. As Rogers [1962] notes, an innovation need not be objectively new. It is the newness of the idea to the individual that determines his reaction to it. The question follows logically from question number one in that if technology transfer is taking place, "is it original or inventive or was it obtained elsewhere?" Original thoughts are somewhat rare and in the majority of cases, do not occur [Gruber and Marquis, 1969].

Question three was: "There are some people who are self-motivated and others that are externally motivated. On a scale of 1-7, where would you place yourself?" This question is a "forced choice" type question where the interviewee was forced to choose on a scale of one to seven, that point where he considers himself to be located. The "forced choice" method has proved its value over other methods in that it produces more objective evaluations, yields a more normal distribution, and can be easily machine scored [Maier, 1973]. As the question was asked, a visual aid scale displaying one through seven was shown to facilitate the interviewee's thought processes. The question calls for a self-evaluation which is considered by the authors to be reasonably accurate in view of the education level of the population. On the scale, one is equated to a completely self-motivated person and seven is equated to a completely externally motivated person. The relationship of the degree of self/external motivation to the other variables within the Rewards Model is germane to this study.

Question four was: "What kind of organization did you belong to at the time?" This question was also a "forced choice" question utilizing a scale of one to seven. Again, the interviewee was shown a visual aid to assist in his choice. The lower extreme on the scale indicates that the organization was considered by the interviewee to be a growing one while the upper extreme of the scale would be an organization which was contracting. This question was inserted here

because it is believed that the growth factor of any organization effects the reward structure and rewards available or perceived to be available to the individual within the organization. The growth, or lack of it, affects the manner in which new ideas are received.

In an effort to bridge the gap from question four to question five, a visual aid was shown displaying the rewards available to government service employees. In most cases, the respondents agreed with the list as shown. The list contained the following:

QSI = Quality Step Increase

SSP = Sustained Superior Performance

BS = Beneficial Suggestion

PA = Peer Approval

SA = Superior Approval

SESS = Self Esteem/Self Satisfaction

The QSI, SSP, and BS are considered to be formal or extrinsic rewards while PA, SA, and SESS are considered informal or intrinsic in nature.

Question five was split into two parts. The first part was: "(1) Realizing that there are various individual benefits that can be received, what did you perceive to be your benefit from the transmission of the idea at the time? (There may be more than one)". This question was designed to cause the interviewee to identify the rewards that were available to him as he perceived them. Perceived rewards which were identified in the "other" category with a frequency in excess

of one, were added to the perceived reward list and included as variables in the data analysis. Only two were added:

SUBA = Subordinate Approval

PRM = Promotion

SUBA is categorized as an intrinsic reward and PRM as an extrinsic.

The rewards as perceived by the individual in an organization identifies the reward(s) that motivated him to transmit the idea. The second part was: "(2) Which did you perceive as the most important?" The significance of this part was the identification of the one single perceived reward which was the most important to the individual in motivating him to transmit the idea. The response to this question (2) is a subset of the first part (1) of the question. The response to question five is significant in that it will identify whether intrinsic or extrinsic rewards are more important to the population surveyed.

Question six was: "How strongly do you feel that the reward initially perceived motivated you to offer or transmit the idea?" Again, this question was of the "forced choice" methodology on a scale of one to seven. The interviewee was shown a scale of one to seven which identified a one as being strongly motivated by the perceived reward and seven being a weak motivation by the perceived reward. It is with understanding that once the actual reward is received from transmission, there may be an alteration of the degree of motivation of the initial perceived reward. The magnitude of this

alteration is an unknown factor and difficult to specifically identify. The only known source is the receiver himself. The significance of the alteration is not the alteration itself, but rather the awareness thereof and that possibly, the altered perceived reward overlaps and may tend to erase the initial perceived reward.

Question seven was divided into two parts. The first part was "(1) Did you receive a reward?" and "(2) What reward did you receive?" The rationale behind this question was to determine whether or not a reward was received and, if so, which reward. The identification of which reward was received as compared to which reward(s) was perceived is significant in the analysis of the importance of the reward structure.

Question eight was: "How did that reward alter your willingness to offer additional ideas?" As indicated earlier, this was again a "forced choice" question with a scale ranging from one to seven. A choice of one equated to no alteration and a choice of seven equated to a strong alteration in willingness to offer additional ideas. It required the interviewee to select a specific point on the scale which most closely fit any alteration he may have experienced in his willingness to offer additional ideas as a result of the reward actually received. The degree of alteration or dampening effect was expected to relate to questions five and seven, perceived reward and actual

reward respectively, and possibly modified by the effect of the response to question three, motivation.

As a result of the eight questions, the following variables were identified for inclusion in the analysis:

- (1) TECHTRANS = Technology Transfer
- (2) IDEAGEN = Idea Generation
- (3) MOTYPE = Personal Motivation Type
- (4) ORGTYPE = Organization Growth Status
- (5) PERWARD = Potential Perceived Reward
- (6) PRIMWARD = Primary Motivating Perceived Reward
- (7) MOTPERWARD = Motivation of the Perceived Reward
- (8) REWREC = Was Reward Received?
- (9) REWARD = Actual Reward Received
- (10) MOTALT = Alteration in Willingness to Offer New Ideas

In addition, other variables identified for possible use regarding the population surveyed are as follows:

- (11) GRADE = Grade Level (Numerical)
- (12) LINK = Linker Score
- (13) AGE = Individual's Age
- (14) DEGREE = Undergraduate or Graduate Level
- (15) LOCATION = Geographical Location of Individual's

Primary Place of Employment

The relationships of the variables or lack of relationships is expected to support the hypothesis that perceived reward is a factor within the Theoretical Predictive Model of technology transfer.

Subsequent to gathering the data, a coding tabulation sheet was designed to capture the data in its simplest form and aid in transforming the data into machine compatible format. The tabulation is shown in Appendix B. The actual raw data utilized in the research is shown in Appendix D.

V. ANALYSIS

The interview is one of a sequence of steps, some preceding and anticipating the interview itself, others following directly from it. Each step is dependent upon the one preceding it and results in succeeding steps.

As an initial point of genesis for the analysis of the response data from the interviews conducted, a specific question was asked relating to the hypothesis stated above. This specific question addressed the point of the strength of motivation of the reward that the individual perceived prior to transmitting the idea into the organization for utilization. The individual was shown a scale of one to seven where one indicated a very strong motivation and seven was a weak motivation. The aggregate responses indicated a mean response of 2.713 with a standard deviation of 1.577. The responses included both situations where the idea was utilized showing that technology transfer did occur and where the ideas were rejected by the organization indicating that technology transfer did not occur. In either case, the motivation for the individual of the perceived reward was strong. Appendix C explains the Chi-square Test of Independence for two variables. Included in Appendix C is the table for both variables, motivation of the perceived reward (MOTPERWARD) and technology transfer (TECHTRANS). The Chi-square

Test for Independency response results indicate that the two variables are independent of one another. This means that motivation to transmit an idea into the organization does not depend on whether the idea is going to be utilized or rejected. Therefore, if the motivation of the perceived reward is significant whether or not transmission of the ideas occurs, then the motivation of the perceived reward is an important factor where transmitting of ideas in the sense of transfer of technology is taking place.

When one considers the Rewards Model discussed in Chapter Two, one sees that there are a great many variables which have potential impact and/or relationships with the perceived rewards or motivation of these perceived rewards to the receiver. The variables which are an inherent part of the model will be discussed first and then the variables which are an environmental force on the model but reside outside the Rewards Model will be addressed.

Utilizing the Statistical Package for Social Sciences (SPSS) [Nie 1970] the Chi-squared Test for Independence was applied to the variables within the Rewards Model. The same procedures were utilized as were developed in Appendix C for the Chi-squared Test for Independence. In each case where variables of the Rewards Model were subjected to the Chi-Square test for Independence, the aggregate distribution of responses for those variables obtained through the interview instrument were utilized. Therefore, in the interpretation of the Chi-Square

results, statements are made regarding whether the results are statistically significant as to the aggregate distribution of the two variables. The Null hypothesis under test was that the two variables are independent of one another with respect to the distribution of responses from the interviews. Rejection of the Null hypothesis at a 90 percent level or greater is considered statistically significant. The tables for the variables discussed are included as part of Appendix C for statistical and informational purposes. The following variables showed significant dependency with respect to the aggregate distribution of responses which the authors considered worthy of note.

When one refers to the perceived reward in the Rewards Model, one is first concerned with the multiple number of rewards which fall within the perception of the receiver out of the total rewards (PERWARD) that are available in the organization. Secondly, one is concerned with the primary reward (PRIMWARD) which one received which motivated one more than any other perceived reward and lastly, the strength of the motivation of that primary perceived reward (MOTPERWARD). As one would expect, statistical evidence supports the fact to a significant degree that these factors of perceived rewards as mentioned above are dependent on one another.

The results of the study indicate that better than 80 percent of the time the distributions for the motivation of the primary perceived reward (MOTPERWARD) will be the same as for the type of personality

(MOTYPE) of the individual, whether the individual is the self-motivated type or motivated by extrinsic rewards.

The type of personality (MOTYPE) of the receiver is an important factor in the Rewards Model. This personality of the receiver includes the passive individual within the organization who is periodically stimulated by the extrinsic reward structure of the organization and the outgoing, self-confident, self-motivated individual. Therefore, this personality type plays a vital role in the kinds of rewards perceived and the alteration experienced if rejection of the idea occurs by the organization. An analysis of the results of the Chi-Square test for the variable combinations, personality type (MOTYPE) and the potential perceived reward (PERWARD), personality type (MOTYPE) and the primary motivating perceived reward (PRIMWARD) and personality type (MOTYPE) and the alteration in offering new ideas (MOTALT) indicate that in all cases, the distribution of the responses for the variables are significantly dependent. This emphasizes the impact that this variable has on the internal working of the Rewards Model structure. It further relates to the interrelationship which exists between the variables of the Rewards Model and the influences that one variable, personality type, has on causing ideas to flow into the organization.

Statistical evidence supported the dependent relationship between the potential perceived rewards (PERWARD) on the part of the

receiver, the primary motivating perceived reward (PRIMWARD) and the actual rewards (REWARD) received from the organization. Therefore, the perceived equitability of rewards exerts an influence on the functioning of the Rewards Model. This relationship between the perception of rewards and actual rewards received forms the basis for the receiver in determining equitability. It is the author's evaluation that the perception of equitability of rewards received and the type of personality jointly affect the willingness of the receiver to offer new ideas. In turn, these two factors, perception of equitability and personality type provide the Rewards Model with the ability to utilize past learning experiences for the receiver in a feedback loop in determining expectancies about future idea transmissions.

The response of the interviewees indicated that their primary perceived rewards could be categorized as intrinsic rather than as extrinsic rewards (See Figure 6). The type of population which was utilized in this study could have had a great influence on this outcome. However, the immediate impact is that if an organization is utilizing an extrinsic reward system to encourage idea transmission, it might reflect on these findings and utilize the intrinsic rewards which appear to have much more strength and impact in motivating certain individuals.

It is the author's contention that:

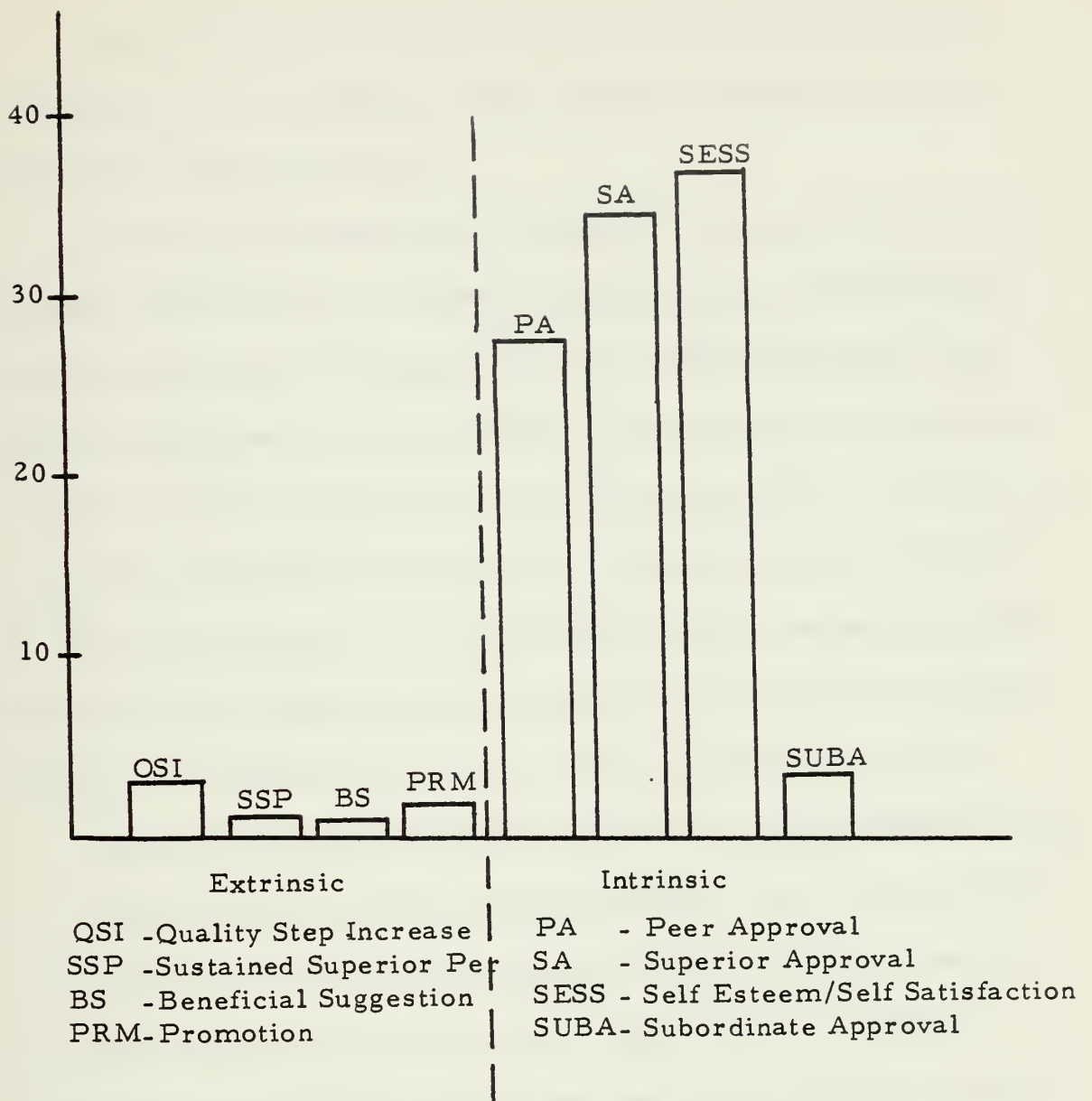


Figure 6 Primary Perceived Rewards

This figure portrays the propensity for the Intrinsic reward to be the motivating perception for individuals allowing idea transmission.

* the motivation of the perceived reward (MOTPERWARD) is a strong factor in transmitting of ideas into the organization whether the idea is utilized or not and

* the significant dependency which exists between the perceived rewards (PERWARD), the primary motivating reward (PRIMWARD) and the motivation of the perceived reward (MOTPERWARD) to the other variables of the Rewards Model serve to portray the significant contribution that the perceived reward has in motivating the receiver to transmit his idea into the organization. Because of this contribution of perceived rewards to the transmission process, perceived rewards are vital to the transfer mechanism process and belong as an integral factor to the Theoretical Predictive Model of technology transfer.

VARIABLES OUTSIDE WHICH IMPACT ON THE REWARDS MODEL

Other variables which are not directly part of the Rewards Model exert pressure on the internal workings of the model purely because the model does not exist in a vacuum. These other variables are organization type (ORGTTYPE) and the linker scores (LINK) associated with the individuals interviewed. An explanation of the linker score implication will be fully discussed prior to discussing its impact on the Rewards Model variables. These variables will be discussed sequentially. The authors selected these outside variables as the ones which appeared to have the greatest influence on the Rewards Model variables.

TYPE OF ORGANIZATION

It was felt that the growth factor of an organization affects the reward structure and the rewards available or perceived to be available to the receiver in the organization. In other words, whether an organization is growing or contracting will affect the way new ideas are received. As a result of the interview responses, there was a significant dependent relationship between the aggregate distributions which exists for the type of organization (ORGTTYPE) and the actual rewards (REWARD) available to the receiver. Further, the study indicated that the distributions of the type of organization (ORGTTYPE) and the rewards perceived (PERWARD) by the receiver would be the same more than 80 percent of the time. Whether the organization is growing or contracting, coupled with the personality of managers which are often reflected in their employees and the implementation and utilization of certain reward structures has a great impact on idea flow. How the above factors are perceived by the receiver in a particular organization will determine in large measure his willingness to initiate idea transmission. Therefore, the type of organization exerts a significant force on the rewards, both perceived and actual, within the organization and hence, idea flow resulting in organizational technology transfusion. One could expect that ideas would be more readily accepted into an organization which was expanding and therefore looking to new, innovative ideas than the organization which is status quo or contracting.

LINKER SCORE

As a background for the linker score variable, the study by Creighton, Jolly, and Denning, [1972], the Theoretical Predictive Model of technology transfer attempted to precisely identify the specific factors which belong to the transfer mechanism which allows technological information to flow. When this Predictive Model of technology transfer from the supplier to the user organization was developed, the linker concept which was one of the nine basic factors, attracted more attention than the other factors. The linker concept seemed to act as a bridge between the source of knowledge and the user/receiver of the knowledge. The linker was conceptualized as a dynamic force which could be grasped rather than a passive, nebulous concept which operates without regard to external pressures. Further, in the study mentioned above, it was hypothesized that there existed a relationship between the output efficiency utilization of research and development and the behavioral characteristics of the individuals in the user organization. Linker and stabilizer type performance were defined and a methodology for identifying such individuals was formed into a measuring instrument [Jolly and Creighton, 1974]. This measuring instrument was administered to the same population utilized in this study and the resultant linker scores were used as an outside variable and applied to the Rewards Model variables with the following results. The linker score (LINK) distribution was compared with four distribution

responses of the Rewards Model variables. These variables were personality type (MOTYPE), potential perceived reward (PERWARD), the motivation of the perceived reward (MOTPERWARD) and the alteration in offering new ideas (MOTALT). Each of the results indicated a significant dependent relationship between the distribution of responses and the linker score.

Therefore, the linker score has a great dependency to the variables within the model and reflect a dependency between these two factors of the transfer mechanism and the Theoretical Predictive Model of technology transfer. This would lead one to generalize that there are interrelationships between all the nine factors of the Theoretical Predictive Model of technology transfer.

VI. CONCLUSIONS AND RECOMMENDATIONS FOR FUTURE STUDY

The thrust of this study has been to examine a population of higher grade Federal Government Civil Service Employees (GS 13 through GS 15), presently engaged as students in a Master of Science Degree program at the Naval Aviation Executive Institute, Point Mugu, California. The personal interview method was utilized following an oral interview questionnaire form prepared for this specific purpose.

The hypothesis is that the factor in the technology transfer model identified as perceived reward to the receiver is important when attempting to predict the rate of movement of technology within an organization. The results of the interviews indicated that the motivation of the perceived reward is a strong and vital factor in the transmission of ideas into the organization whether or not the idea was utilized. Further, the dependency which exists between the perceived rewards, the primary motivating reward, and the motivating strength of the primary motivating reward to the other variables of the theoretical reward model serve to portray the significant contribution of the perceived reward in motivating the receiver to transmit his idea into the organization.

It is, therefore, primarily due to the contribution of perceived rewards to the transmission process, that perceived rewards are determined to be vital to the transfer mechanism and thus support

the hypothesis that perceived rewards belong as an integral factor within the Theoretical Predictive Model of technology transfer.

It was further concluded that there was a significant relationship between perceived reward and other factors of the Theoretical Predictive Model of technology transfer. These factors were the organization where the transmitter of the idea resided and also the linker score of the individuals interviewed. Therefore, it was shown that the factors of the Theoretical Predictive Model do not exist as separate entities but have an interdependency between factors of the Theoretical Predictive Model.

RECOMMENDED FURTHER RESEARCH

The conclusions drawn from this study were the result of interviewing a specific population which had specific characteristics. It would be interesting to replicate this study with different types of populations to find if there would be any correlation of finding. It could be hypothesized that craftsmen are motivated by the same intrinsic type reward structures as are the top level managers. Further, that assembly line workers are motivated by much the same reward structure as clerical workers. The authors believe that based on the research conducted, the above relationship would be valid and the hypothesis could be supported.

APPENDIX A

ORAL INTERVIEW FORM

PERCEIVED REWARD

1. Please relate to me an idea that you have had in recent years in an organization which was utilized/not utilized be it either management or technically oriented. _____

2. Could you relate how you generated the idea? Was it from something you read or maybe a conference attended? _____

3. There are some people who are self-motivated and others that are externally motivated. On a scale of 1-7, where would you place yourself?

(show form)

MOTIVATION

SELF

EXTERNAL

1

2

3

4

5

6

7

4. What kind of organization did you belong to at the time? (show form)

ORGANIZATION

GROWING

CONTRACTING

1

2

3

4

5

6

7

We see the reward structure in government service as follows:

(show form)

QSI, SSP, BS, PA, SA, SE/SS

Do you see it any differently?

5. (1) Realizing that there are various individual benefits that can be received, what did you perceive to be your benefit from the transmission of the idea at the time? (There may be more than one)

(2) Which did you perceive as the most important?

Answer:

(a) QSI SSP BS PA SA SE/SS OTHER _____

(b) QSI SSP BA PA SA SE/SS OTHER _____

6. How strongly do you feel that the reward initially perceived motivated you to offer or transmit the idea? (show form)

MOTIVATION OF PERCEIVED REWARD

STRONG

WEAK

1

2

3

4

5

6

7

7. Did you receive a reward? _____ What reward did you receive? _____

8. How did that reward alter your willingness to offer additional ideas? (show form)

ALTERATION

NO ALTERATION

STRONG ALTERATION

1

2

3

4

5

6

7

APPENDIX B

NYEWEL CAPTION SHEET #1-A

		CC
<u>Source</u>	01 = Pt Mugu	1
	02 =	2
	03 =	
1.	Technology Transfer (TECHTRANS) Yes =0, No=1	3
2.	Idea Generation (IDEAGEN) Original=1, Non-original=2	4
3.	Personal Motivation Type (MOTYPE)	5
4.	Organization Growth Status (ORGTTYPE)	6
5.a.	Potential Perceived Reward (PERWARD)	7
	(1) QSI (Quality Step Increase)	8
	(2) SSP (Sustained Superior Performance)	9
	(3) BS (Beneficial Suggestion)	10
	(4) PA (Peer Approval)	11
	(5) SA (Superior Approval)	12
	(6) SESS (Self Esteem/Self-Satisfaction)	13
	(7) PRM (Promotion)	14
	(8) SUBA (Subordinate Approval)	15
	(9) OTHER	16
b.	Primary Motivating Perceived Reward (PRIMWARD) (same scoring as in 5. a. above)	17
6.	Motivation of Perceived Reward (MOTPERWARD)	18
7.a.	Was Reward Received? (REWREC) Yes=1, No=2	19
b.	Actual Reward (REWARD) (same scoring as in 5. a. above)	20
8.	Alteration in Offering New Ideas (MOTALT)	21
9.	Grade Level (GRADE)	22
10.	Linker Score (LINK) 35-59	23
11.	Age (AGE) 40 or Under =1, Over 40 =2	24
12.	Degree (DEGREE) Undergraduate =1, Graduate =2	25
13.	Location (LOCATION) Pt. Mugu =1, Other =2.	28
		29

APPENDIX C

The Chi-Square Test of Independence

The Chi-Square test was used to determine the significance of differences between distributions of variables within the Rewards Model; i. e. Motivation of the Perceived Reward and Technology Transfer. The Null hypothesis under test was that the two variables are independent of one another with respect to the distribution of responses from the interview.

To test this hypothesis, the proportion of responses to whether technology transfer occurred were then compared with the proportion of responses to the motivation of perceived rewards.

The Null hypothesis was tested by

$$X^2 = \sum_{i=1}^k \sum_{j=1}^k \frac{(O_{ij} - E_{ij})^2}{E_{ij}}$$

where O_{ij} = observed number of cases categorized in the i th row of the j th column.

E_{ij} = number of cases expected under H_0 to be categorized in the i th row of the j th column

The values of Chi-Square yielded by the above formula are distributed approximately as Chi-Square with $df = (r-1)(k-1)$, where r = the number of rows and k = number of columns in the contingency table.

The expected frequency for each cell (E_{ij}) was found by multiplying the two marginal totals common to a particular cell, and then divide this product by the total number of cases. This results in an expected cell size proportional to the marginal totals. In the event no other criteria for expected frequency is known, the simple calculation of proportional cell size is considered a reasonable expectation. Note that if the observed frequencies are in close agreement with the expected frequencies, the differences ($O_{ij} - E_{ij}$) will be small, and consequently the value of Chi-Square will be small. However, if some or many of the differences are large, then the value of Chi-Square will also be large. The larger Chi-Square is, the more likely it is that the responses will not support the argument that the variables are independent within a specified degree of confidence. Therefore, one would reject the Null hypothesis in favor of the alternative hypothesis. It should also be noted that the test will tell only whether or not the two groups, attributes or variables are independent. It will not tell the degree of association or the direction of dependency.

The tables used in the analysis chapter are included as part of this appendix.

APPENDIX C (Continued)

CHI-SQUARE TEST OF INDEPENDENCE CONTINGENCY TABLES

TECHNOLOGY TRANSFER (TECHTRANS)

	YES	NO		
	Oij	Oij	Eij	X ²
Motivation of	4	4	4	0
Perceived Reward	6	6	6	0
(MOTPERWARD)	10	10	10	0
				0

Primary Motivating Perceived Reward (PRIMWARD) Motivation of Perceived Reward (MOTPERWARD)

Class	Oij	Class	Oij	Eij	X ²
(1-4)	1 strong	(1-2)	20	10.5	17.19
5	11	3	14	12.5	.36
(6-9)	28 weak	(4-7)	6	17	14.23
	40		40		31.78

DF = 2

Significance 99%

Motivation of Perceived Reward (MOTPERWARD)

Personal Motivation Type (MOTYPE)

	Class	Oij	Class	Oij	Eij	X ²
Strong	1	8 self	1	6	7	.2856
	2	12	2	22	17	2.94
	3	14	3	10	12	.66
Weak	(4-7)	6 external	(4-7)	2	4	2
		40		40		5.8856

DF = 3

Significance = 80%

<u>Personnel Motivation Type</u> (MOTYPE)			<u>Primary Motivating Perceived Reward</u> (PRIMWARD)			
	Class	Oij	Class	Oij	Eij	X ²
Self	(1-2)	28	(1-4)	1	14.5	25.14
External	(3-7)	<u>12</u>	(5-9)	<u>39</u>	25.5	<u>14.29</u>
		40		40		39.43

DF = 1

Significance = 99%

<u>Personal Motivation Type</u> (MOTYPE)			<u>Alternation in Offering New Ideas</u> (MOTALT)			
	Class	Oij	Class	Oij	Eij	X ²
Self	1	6 none	1	13	9.5	2.578
	2	22	2	11	16.5	3.666
	3	10	3	7	8.5	.529
External	(4-7)	<u>2 strong</u>	(4-7)	<u>9</u>	5.5	<u>4.45</u>
		40		40		11.227

DF = 3

Significance = 98%

<u>Motivation of Perceived Reward</u> (MOTPERWARD)			<u>Linker Score</u> (LINK)			
	Class	Oij	Class	Oij	Eij	X ²
Strong	1	8 stabilizer	(35-41)	6	7	.286
	2	12	(42-44)	6	9	2
	3	14	(45-47)	6	10	3.2
Weak	(4-7)	<u>6 linker</u>	(48-59)	<u>22</u>	14	<u>9.13</u>
		40		40		14.628

DF = 3

Significance = 99%

<u>Linker Score</u> (LINK)			<u>Personal Motivation Type</u> (MOTYPE)			
	Class	Oij	Class	Oij	Eij	X^2
Stabilizer	(35-41)	6 self	1	6	6	0
	(42-44)	6	2	22	14	9.143
	(45-97)	6	3	10	8	1.0
Linker	(48-59)	22 external (4-7)		2	12	16.667
		<u>40</u>		<u>40</u>		<u>26.81</u>

DF = 3

Significance = 99%

<u>Linker Score</u> (LINK)			<u>Alternation in Offering New Ideas</u> (MOTALT)			
	Class	Oij	Class	Oij	Eij	X^2
Stabilizer	(35-41)	6 none	1	13	9.5	2.579
	(42-44)	6	2	11	8.5	1.470
	(45-50)	14	(3-4)	11	12.5	.36
Linker	(51-59)	14 strong	(5-7)	5	9.5	4.26
		<u>40</u>		<u>40</u>		<u>8.67</u>

DF = 3

Significance = 95%

<u>Primary Motivating Perceived Reward</u> (PRIMWARD)			<u>Potential Perceived Reward</u> (PERWARD)			
	Class	Oij	Class	Oij	Eij	X^2
	(1-4)	4	(1-4)	32	.18	21.778
	5	36	5	35	35.5	.01
	(6-9)	75	(6-9)	48	61.5	5.927
		<u>115</u>		<u>115</u>		<u>27.714</u>

DF = 2

Significance = 99%

Primary Motivating Perceived Reward
(PRIMWARD)

Actual Reward
(REWARD)

Class	Oij	Class	Oij	Eij	X ²
(1-5)	4	(1-5)	64	34	52.94
6	36	6	10	23	14.69
(7-10)	75	(7-10)	41	58	9.96
	<u>115</u>		<u>115</u>		<u>77.59</u>

DF = 2

Significance = 99% .

Potential Perceived Reward
(PERWARD)

Actual Reward
(REWARD)

Class	Oij	Class	Oij	Eij	X ²
(1-4)	5	(1-4)	64	34.5	50.45
(5-6)	62	(5-6)	10	36	37.57
7	37	7	24	30.5	2.77
(8-9)	5	(8-9)	6	5.5	.09
10	6	10	11	8.5	1.47
	<u>115</u>		<u>115</u>		<u>92.336</u>

DF = 4

Significance = 99%

Personal Motivation Type
(MOTYPE)

Potential Perceived Reward
(PERWARD)

	Class	Oij	Class	Oij	Eij	X ²
Self	1	21	(1-3)	5	13	9.85
	2	69	4	27	48	18.38
External	(3-7)	25	(5-9)	83	54	31.15
		<u>115</u>		<u>115</u>		<u>59.378</u>

DF = 2

Significance = 99%

Organization Growth Status
(ORGTTYPE)

Potential Perceived Reward
(PERWARD)

	Class	Oij	Class	Oij	Eij	X ²
Growing	(1-2)	22	(1-4)	32	27.0	1.85
	3	43	5	35	39.0	.82
	4	30	6	37	33.5	.73
Contracting	(5-7)	20	(7-9)	11	15.5	2.613
		<u>115</u>		<u>115</u>		<u>6.013</u>

DF = 3

Significance = 80%

Organization Growth Status
(ORGTTYPE)

Actual Reward
(REWARD)

	Class	Oij	Class	Oij	Eij	X ²
Growing	(1-2)	22	(1-5)	64	43	20.51
	3	43	6	10	26.5	20.55
	4	30	7	24	27	.67
	5	14	8	6	10	3.2
Contracting	(6-7)	6	(9-10)	11	8.5	1.47
		<u>115</u>		<u>115</u>		<u>46.4</u>

DF = 4

Significance = 99%

Linker Score
(LINK)

Potential Perceived Reward
(PERWARD)

	Class	Oij	Class	Oij	Eij	X ²
Stabilizer	(35-43)	21	(1-3)	5	13.0	9.84
	(44-46)	26	4	27	26.5	.019
	(47-49)	15	5	35	25.0	8.0
	(50-52)	15	6	37	26.0	9.31
	(53-58)	29	(7-8)	5	17.0	16.94
Linker	59	9	9	6	7.5	.60
		<u>115</u>		<u>115</u>		<u>44.71</u>

DF = 5

Significance = 99%

APPENDIX D

THE RAW DATA CAN BE READ UTILIZING THE CARD COLUMN FORMAT SHOWN IN APPENCIX B.

N OF CASES 40

01111359	922	1133513911
01011359	922	1133513911
010222356	6316	3145725911
011222356	632	1145725911
0101113456	6316	2134624312
0111113456	632	1134624312
010222459	53119	2134113321
011222459	532	2134113321
0102113456	51157	5135913622
0112113456	552	3135913622
0102114456	6219	2155125122
0111114456	622	1155125122
0101224568	6116	2144224621
0112224568	612	4144224621
01012231456	6316	6135513522
01122231456	612	2135513522
01011356	6716	5145024811
011113526	662	5145024811
0102224456	6211	4135014021
0112224456	622	1135014021
0102224456	5215	5145824321
0111224456	522	4145824321
010123136	6219	3134424511
01112345	532	3134424511
0102223456	6119	1135513921
0112223456	612	1135513921
01012456	6116	1144625222
01122246	612	2144625222
010126456	6716	2134814021
011126456	672	2134814021
010234567	532	1135524311
01123456	632	1135524311
01024367	6216	1144614011
0112436	622	3144614011
0102235456	63165	2134413221
0112235456	632	4134413221
010222456	53117	1134824611
011222456	532	2134824611
0102324698	4511	3133624711
0111325	5215	3133624711

N OF CASES 115

0111135	9922	1133513911
0111135	9922	1133513911
0102223	5631	63145725911
0102223	6631	63145725911
0112223	5632	1145725911
0112223	6632	1145725911
0101113	4631	62134624312
0101113	5631	62134624312
0101113	6631	62134624312
0111113	4632	1134624312
0111113	5632	1134624312
0111113	6632	1134624312

0102224	5531	12134113321
0102224	9531	92134113321
0102224	9531	12134113321
0102224	5531	92134113321
0112224	5532	2134113321
0112224	9532	2134113321
0102213	4511	55135913622
0102213	5511	55135913622
0102213	6511	55135913622
0102213	4511	75135913622
0102213	5511	75135913622
0112213	6511	75135913622
0112213	4552	3135913622
0112213	5552	3135913622
0112213	6552	3135913622
0102214	4621	92155125122
0102214	5621	92155125122
0102214	6621	92155125122
0111114	4622	1155125122
0111114	5622	1155125122
0111114	6622	1155125122
0101222	4611	62144224621
0101222	5611	62144224621
0101222	6611	62144224621
0101222	8611	62144224621
0112222	4612	4144224621
0112222	5612	4144224621
0112222	6612	4144224621
0112222	8612	4144224621
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0112223	4612	2135513522
0112223	5612	2135513522
0112223	6612	2135513522
0101135	6671	65145024811
0111135	2662	5145024811
0111135	6662	5145024811
0102224	4621	14135014021
0102224	5621	14135014021
0102224	6621	14135014021
0112224	4622	1135014021
0112224	5622	1135014021
0112224	6622	1135014021
0102224	4521	55145824321
0102224	5521	55145824321
0102224	6521	55145824321
0111124	4522	4145824321
0111124	5522	4145824321
0111124	6522	4145824321
0101223	1621	93134424511
0101223	3621	93134424511
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0111223	4532	3134424511
0111223	5532	3134424511
0102223	4611	91135513921
0102223	5611	91135513921
0102223	6611	91135513921
0112223	4612	1135513921
0112223	5612	1135513921
0112223	6612	1135513921
0101224	5611	61144625222
0101224	6611	61144625222
0112224	6612	2144625222
0101226	4671	62134814021
0101226	5671	62134814021
0101226	6671	62134814021
0111226	4672	2134814021
0111226	5672	2134814021
0111226	6672	2134814021

0102234	5532	1135524311
0102234	6532	1135524311
0102234	7532	1135524311
0111223	5632	1135524311
0111223	6632	1135524311
0102243	6621	61144614011
0102243	7621	61144614011
0112432	6622	3144614011
0102235	4631	62134413221
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0102235	5631	52134413221
0102235	6631	52134413221
0112235	4632	4134413221
0112235	5632	4134413221
0112235	6632	4134413221
0102222	4531	11134824611
0102222	5531	11134824611
0102222	6531	11134824611
0102222	4531	71134824611
0102222	5531	71134824611
0102222	6531	71134824611
0112222	4532	2134824611
0112222	5532	2134824611
0112222	6532	2134824611
0102232	4451	13133624711
0102232	6451	13133624711
0102232	8451	13133624711
0102232	9451	13133624711
011132	5521	53133624711

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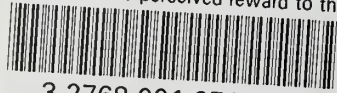
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